

The Analysis of Fluid Intelligence of Adolescents Based on their Birth Order and Gender through the Perceived Parenting Style

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Abstract

The present research has been conducted with the aim of studying the predicting power of the variables of birth order and gender through parenting style on the intelligence of high school adolescents. In order to achieve the above stated aim, 280 individuals of the adolescents of the high schools of the 1st region of Tehran, who were studying in the educational year of 2010-2011 were selected by using multi-stage cluster sampling and tested by using Raven's Progressive Matrices test, parenting Shrink styles and researcher -made demographic characteristics. The methodology of the present research is path analysis method and the obtained data were analyzed by using AMOS20 and SPSS software. The obtained results from this research indicates that the variables of birth order and gender which have been entered into the path analysis for prediction of the intelligence level by using loving and controlling parenting style have a direct and indirect significant effect on fluid intelligence of adolescents. Also, there is a reverse and significant relationship between birth order and adolescent's intelligence which indicates that an increase in the birth order (middle and last children) leads to a decrease in their intelligence level. This reverse effect increases with mediating controlling parenting style. Furthermore, the female gender has a negative effect on intelligence and this negative effect increases through the controlling parenting style. In general, it can be said that the birth order and gender of the adolescents with mediation of controlling and loving parenting style is effective on their intelligence.

Keywords: intelligence, birth order, gender, parenting style, adolescent.

Introduction

Intelligence is an abstract concept and it is a general label for a group of processes which is inferred from the implicit behaviors and responses of individuals (Grath Marnat, 2003). Also, intelligence is considered as the deductive and inductive reasoning ability regarding the relationship between objects and phenomenon (Grady M. Towers, 1988). Sometime, intelligence is defined as what is measure with intelligence tests; for example, Raven's Standard Progressive Matrices (SPM) test measures the inferential content of general intelligence which is also called fluid intelligence and has been defined in Spearman's theory of cognitive ability (Raven, 2003).

The new studies regarding the effects of birth order have been started with the studies of Sir Francis Galton (1874) regarding the scientists' academic intelligence and later on has been studied in the Adlerian's individual psychology theories, Zajonc Confluence theory, family dynamic model of Sulloway and some other people regarding different subjects including: personality traits, intelligence and educational progress (cited by Shannon Schiller, 2006).

The researchers of the topic of birth order believe that the environment plays an important role in the transformation process and especially in the mental development of children (cited by Foster *et al.*, 1989). In this field, the Sulloway Family dynamic model (2007b, 2007a, 1996) with the use of two relation of family dynamism (education and parent succession) describes that why single children in general obtain higher IQ scores than the first children (Wichman *et al.*, 2006). Sulloway believes that the first children are more likely to be the center of attention and investment of their parents and thus have stronger incentives for obtaining their parents satisfaction and meeting their expectations. While, the next children, benefits from lower parental resources;

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because based on the theory of dilution, children benefits in an unequal way from their families' resources (Sulloway, 2007). Based on the Resource Dilution Model, when the number of children increases, the available resources of the parents and their attention are divided between them (Sandra *et al.*, 2007). During this division of economic-mental-emotional capitals, most of the first children gains the most of the benefit and receive the highest attention and the reason for this is that because before the birth of the other children for some time they have been the only one who was using the family resources and after the birth of their siblings also, since they have a superior power and position among them, hence; they benefits the most from the available resources of the family for their survival (Sulloway, 2002).

Avan *et al.* (2007) in a cross-sectional research in Pakistan have studied the effect of the extensive position of the family in the different social classes on the intelligence development of pre-school children between the age of 4 to 5 and have concluded that the large family environment and the short interval between the births have a negative effect on the mental development in the primary childhood and even with controlling the difference among the families, still the effect of birth order on intelligence remains.

On the other hand, the parenting style is a complex activity which includes interactive methods and behaviors between parents and children which affect the child's development separately or in interaction with each other. In fact, the basis of the parenting method indicates the efforts type of the parents for controlling and socializing their children (Baumrind, 1991). Parenting style is described as a complex collection of parent's behaviors which creates an interactive atmosphere between the parent-child during the situations (Mize & Pettit, 1997; cited by Mellani McKay, 2006), which is based on the work of Baumrind and the followers of his theory. In his studies, Baumrind on the quality of the relationship between parents and children have identified two interactive dimensions which show the levels of the warmth and responsiveness of the parents toward their children. Warmth and love relates to the involvement, responsiveness and support degree of the parents of their children (Brenda *et al.*, 2006). Warm parental behaviors include behaviors which are kind, approving, friendly and caring physically and emotionally (Wichman *et al.*, 2006). Control includes demands and expectations are a degree of supervision which is applied on the children by parents in their behaviors and parenting interactions.

The question that how parenting contributes to the children and to which aspect of them it contrib-

utes includes the identification of their abilities and interests (Peter *et al.*, 2007).

With the various above descriptions which each of them in a way deal with the effect of birth order and social – family environment on intelligence, in the present research we seek the analyze the path of the role of the birth order and gender variables by the use of parenting style on the adolescence's intelligence and hence the following question has been studied. Whether the graphical model of the path analysis of the adolescence's intelligence is confirmed with the use of parenting style and birth order and gender?

Research hypotheses

1- There is a reverse and negative relationship between the high school adolescence's intelligence and their birth order.

2- Birth order can predict intelligence.

3- There is a reverse and significant relationship between intelligence and gender.

Methodology

The method of the present research is regression and correlation and it is due to the fact that it is designed for studying the relationship between the variables of birth order and family volume with intelligence of adolescences. Also, in the research, we have compared the intelligence based on the birth order.

Research population

The population of the present research includes all the male and female students in the first year of high school of the first region of Tehran who are studying in public schools and are in the educational year of 2010-2011.

Sample and sampling method

The sample of the present research includes 280 of the students of the first year of high school who were selected from the 12 existing first classes in four high schools of the 1st region of Tehran with the use of multi-stage stratified cluster sampling method. For this purpose, first two schools for girls and two schools for boys have been selected from the public high schools of the 1st region of Tehran randomly and from each school three classes of the first grade of high school were selected randomly. Then, the researcher-made questionnaires of intelligence, parenting style and demographic characteristics were implemented.

Data collection tools

The data required for the present research were collected through three pencil and paper questionnaires:

1- *Parenting styles questionnaire*: Shiffer (1986): a self-reporting questionnaire with 77 questions which evaluates the adolescences in the dimensions of perceived control and love from the side of parents based on the experience in the family and based on a five-point Likert scale of strongly agree to strongly disagree. Based on the combination of the scores in two dimensions of love and control, four parenting styles of authoritative, despotic, easygoing, and indifferent are resulted that for each person indicate the dominance of that parenting style in the family. The reliability coefficient of this scale in the research conducted by Naghashian (2006) is equal to 0.87 and in the studies conducted by Ya'ghobkhani (1994) and Tahmtan (1998) this value is equal to 0.82 and 0.85, respectively with the use of Cronbach's alpha.

2- *Raven's Intelligence Progressive Matrices (SPM) test*: the first format of this test was developed in 1938 by Raven and it has a good validity and re-

liability. In Iran standardization this format with a sample including 4520 people (female and male) in 6 groups of age ranging from 12 to 40 indicate that the reliability of the test with the use of retest, bisection and internal consistency Cronbach methods is equal to 0.77, 0.78 and 0.87, respectively. Also, for testing the validity of the test, a significant correlation was found between the 2nd and 3rd scales of the Cattell culture - free intelligence test with Raven test.

3- *Demographic information questionnaire*: in this research to evaluate the birth order and gender, education and social-economic level an author-made questionnaire has been used.

Structural equation modeling

To evaluate the proposed model, the Structural equation modeling based on AMOS20 software with estimation of maximum likelihood (ML) was used. For testing the fitness of the proposed model, the goodness of fit indexes was used. In the present research, the goodness of fit indexes mentioned in table 1 were used.

Table 1. The fitness of the proposed model based on dispersion indices

Dispersion indices	χ^2	d_f	$^2/d_f\chi$	RMSEA	GFI	AGFI	CFI	IFI	NFI
Proposed model	1.5	5	0.291	.000	0.998	0.993	1.000	1.000	0.996

1) Chi-square (χ^2): a value near zero, insignificant and desirable.

2) ratio: a small value and (0.29) the excellent fitness of the model.

3) Root Mean Square Error Approximate (RMSEA): the value is around 0.000 which indicate the excellent fitness of the proposed model.

4) Goodness of Fit Index (GFI): the value of this index in the present research is equal to 0.998 which indicates to the high model fitness.

5) Adjusted goodness of fit index (AGFI): the

value of this index in the present research is equal to 0.993 which is excellent.

6) Increasing fit index (IFI) and Comparative fit index (CFI): the values of the box indexes in the present research are equal to 1.0000 which indicates to the completed fitness of the proposed model.

7) Bentler-Bonett Index or Normed fit index (NFI): the value of this index is equal to 0.996 which indicates to the complete fitness of the model.

In general, all the indexes indicate to an acceptable fitness of the model.

Table 2. Correlation coefficients between gender, controlling parenting style and intelligence

Pearson's correlation	Birth order	Gender	Loving style	Controlling style	Intelligence
Birth order	1	0.38 **	0.01	-0.05 *	-0.39 **
Gender		1	0.316 **	- 0.092 *	-0.09 *
Loving style			1	0.53 **	0.18
Controlling style				1	- 0.026 *

* P<0.05; ** P<0.01

From table 2, we can see that gender has a significant and reverse relationship with controlling parenting style and intelligence and it has a positive and significant relationship with loving parenting style, i.e., girl adolescence mostly have the perception of loving parenting style. These significant re-

lationships satisfy the fundamental prerequisites of the model. The next step is using birth order and gender as predictors of intelligence and controlling and loving parenting styles. In table 3 the direct and indirect results of the path analysis have been presented.

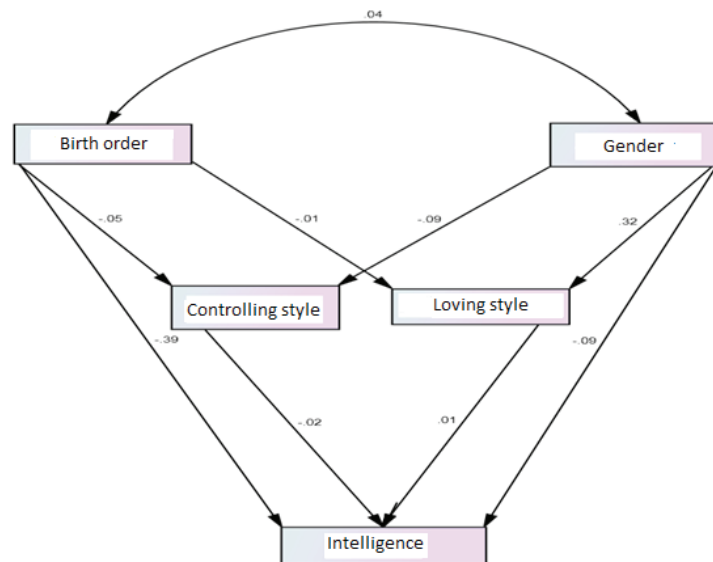


Figure 1. Path analysis and the coefficients of the confirmed model path

Table 3: Significant direct, indirect and total effects

Predicting variable	Direct effect	Indirect effect	Connecting variable	Total effect
Birth order	-0.39	-0.01	Loving style	-0.39**
		-0.05	Controlling style	-0.44**
Gender	-0.09	0.32	Loving style	0.23**
		-0.09	Controlling style	-0.18**
Loving style	0.01	-	-	0.01
Controlling style	-0.02	-	-	-0.02

The results regarding the total direct and indirect effects of birth order on intelligence indicate that there is a negative direct effect ($\beta=-0.39$; $p<0.01$) and also there is a negative indirect effect with mediating role of controlling parenting style ($\beta=0.05$; $p<0.05$). However; it doesn't have a significant effect through the mediating role of loving parenting style ($\beta=-0.05$; $p<0.1$). On the contrary, gender have a small direct negative effect ($\beta=-0.09$; $p<0.05$) but an indirect and strong effect with the mediating role of loving parenting style ($\beta=0.32$; $p<0.01$) on intelligent.

Findings related to the hypotheses of the main model

In this section, first the findings related to the direct paths of the model and the findings related to the indirect paths are reported.

A: Findings related to the direct relationship of the model's variables

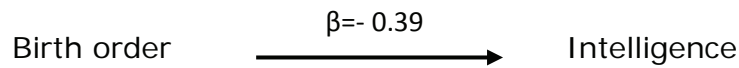
Table 4 presents the paths and their standard coefficients in the main model based on AMOS20 software.

Table 4. Structural model: paths and standard coefficients in the main model

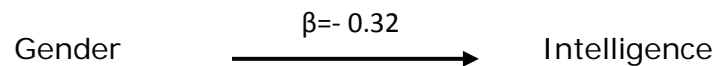
Path	β	Significance level
Birth order	- 0.39	0.001
Gender	- 0.32	0.001
Loving parenting style	0.05	0.071
Controlling parenting style	- 0.09	0.05

Research hypothesis 1: Birth order in a direct way has a negative relationship with cognitive intelligence.

Based on the report of table 4, the path coefficient of birth order to cognitive intelligence is negative and significant ($P < 0.001$, $\beta = -0.039$). It means that the 1st orders of birth have a higher intelligence than the middle or last orders of birth. This finding confirms the 1st hypothesis of the structural model.



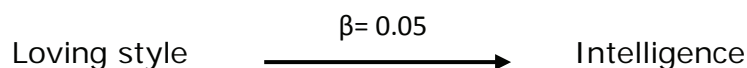
Research hypothesis 2: Gender in a direct way has a negative relationship with intelligence.



Based on the report of table 4, the path coefficient of gender to intelligence is negative and significant ($P < 0.001$, $\beta = -0.032$). It means those with code 1 have more intelligence than those girls who

have got code 2. This finding confirms the 2nd hypothesis of the model.

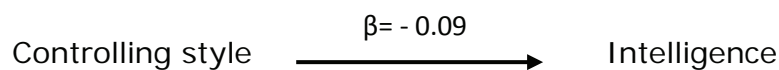
Research hypothesis 3: Loving parenting style in a direct way has a positive relationship with intelligence.



Based on the report of table 4, the path coefficient of parenting style to intelligence is not positive and significant ($P < 0.071$, $\beta = 0.05$). It means that this finding confirms the 3rd hypothesis of the struc-

tural model.

Research hypothesis 4: Controlling parenting style in a direct way has a negative relationship with intelligence.



Based on the report of table 2, the path coefficient of controlling parenting style to intelligence is negative and significant ($P < 0.05$, $\beta = -0.09$). It means that this finding confirms the 4th hypothesis of the structural model.

B: Findings related to the mediating relationships of the model variables

Research hypothesis 5: Gender in an indirect way and through controlling parenting style has a negative relationship with intelligence.

As table 4 shows, the coefficient of the indirect path of gender to intelligence (paths a and b) are significant at the level of 0.05.

Therefore; the given path is significant as it is expected base on the previous obtained results. Generally, the obtained results from the study based on the indirect effect of gender on intelligence through the mediating role of controlling parenting style confirms hypothesis 5.

Research hypothesis 6: Gender in an indirect way though the mediating role of loving parenting style has a negative relationship with intelligence.

As table 4 shows, the coefficient of the indirect path of gender to intelligence through the path of loving parenting style (paths a and b) is not significant at the level of 0.07.

Therefore; according to the obtained results from the study hypothesis 6 based on the indirect effect of gender on intelligence through the mediating role of loving parenting style is not confirmed.

Research hypothesis 7: Birth order in an indirect way has a negative relationship with intelligence through controlling parenting style.

As the content of table 4 shows, the coefficient of the path of birth order to intelligence (path c) is significant at the level of 0.001. Table 4 shows a situation in which birth order has a significant effect on intelligence through the mediating role of controlling parenting style. Therefore; the given path is significant as it is expected based on the previous results. Generally, the obtained results, confirms hypothesis 7 which indicates to the indirect effect of birth order on intelligence through the mediating role of controlling parenting style.

Research hypothesis 8: Birth order in an indirect way has a negative relationship with intelligence through the mediating role of loving parenting style.

As the content of table 4 shows, the coefficient of the path of birth order to intelligence (path c) is significant at the level of 0.05. Therefore; the given path is significant as it is expected based on the previous results. Generally, the obtained results, confirms hypothesis 8 which indicates to the indirect effect of birth order on intelligence through the mediating role of loving parenting style.

Discussion and conclusion

The obtained results from the path analysis of intelligence based on the birth order, gender through the mediating role of parenting styles indicate that the proposed model has a very high fitness and the coefficient of the significance effect between the explaining and criterion variables were obtained. In the analysis the path of predicting variables of birth order and gender on fluid intelligence has a direct effect and has a indirect effect on the intelligence level of adolescences through the mediating role of controlling and loving parenting styles. The results indicate that the direct effect of birth order on intelligence is more significant and negative compared to gender. It means with increasing the birth order the intelligence level of children decreases. However; the indirect effect of it is less than the gender through the mediating role of styles.

On the contrary, the direct effect of gender on intelligence is weak, however; the indirect effect of it is high.

This finding is consistent with the findings of the studies of (Zajonc, 2007; Sandra, 2007; Peter, 2007; Shanon, 2006) who have shown that the first children of families obtain the highest scores in intelligence tests compared to the next children of them. These results indicate that the non-first children of families, due to the situation they have in the family and the limitations they gain in the family, face some problem in their intelligence development and culminating their mental capabilities in interaction with the environment and parents and show some shortcomings from themselves. As a result for preventing this lack of development resulting from the interaction with the environment and the parents with regards to gender and birth order we can establish some preventing measures based on modification of interactive and parenting styles of parents for reducing the direct and indirect negative effects of birth order and gender on intelligence. Based on this the topic of birth order can have educational or relational appli-

cations and its various applications can be explained better with the use of Sulloway theories and combinational model of Zajonc. It means that with considering the effect of the interactional shortcomings for middle and last children of the extended families, which has a significant effect on intelligence development of them, we can provide improved education and enriched verbal environments for the next children in families, so they can benefit from the environment and get less damaged from the social interaction inside the families.

Limitations of the study

This research has some limitations such as the measurement scale of the variables, lack of possibility of controlling the number of the family members and styles comparisons among the two genders and the born children have been different.

Recommendations

It is recommended that in future studies distance measurement scales will be used for measurement of different types of parenting styles.

Also for intelligence measurement, different tests can be used.

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